Technical Presentation

4-2023

Today’s Presenter

Dr. Peter Geigle

Co-founder, CEO and
member of the executive board

25 years of experience in biotechnology

Founder of the biotech company ‘CellMed’, which was merged with ‘Biocompatibles’ in 2005 and subsequently acquired by UK BTG in 2010

2011 Dr. Peter Geigle developed the initial idea for cmblu’s revolutionary organic battery

cmblu

The Future of Energy Storage is Organic

Safe

No Fire Risk

No Explosion Risk

Moderate PH

Sustainable

Environmentally Friendly

> 90% Sourcing and Value Creation Locally(1)

No rare or Conflicted Materials

Fully Recyclable

Small Footprint

Scalable

Power and Capacity Independently Scalable

No Limitation in Size

Modular Design

Modular Production

cmblu

Source: TUV Sud, CMBlu, company presentations and publicly available information.
(1) CMBlu's batteries are designed in such a way that over 90% of materials required for the manufacturing process can be sourced locally

Development of the Technology

- ✓ We have started on a white sheet of paper
- ✓ cmblu runs one of the largest non-Lithium battery lab worldwide with more than 100 researchers
- ✓ We continuously test 80+ batteries of all sizes in house
- ✓ We have collected data from >1.5 Million hours battery life in hundreds of thousands of cycles
- ✓ We have a State-of-the-Art pilot production line since 12-2020
- ✓ We are audited according to ISO9001 - ISO14001 - ISO45001

Company profile and overview

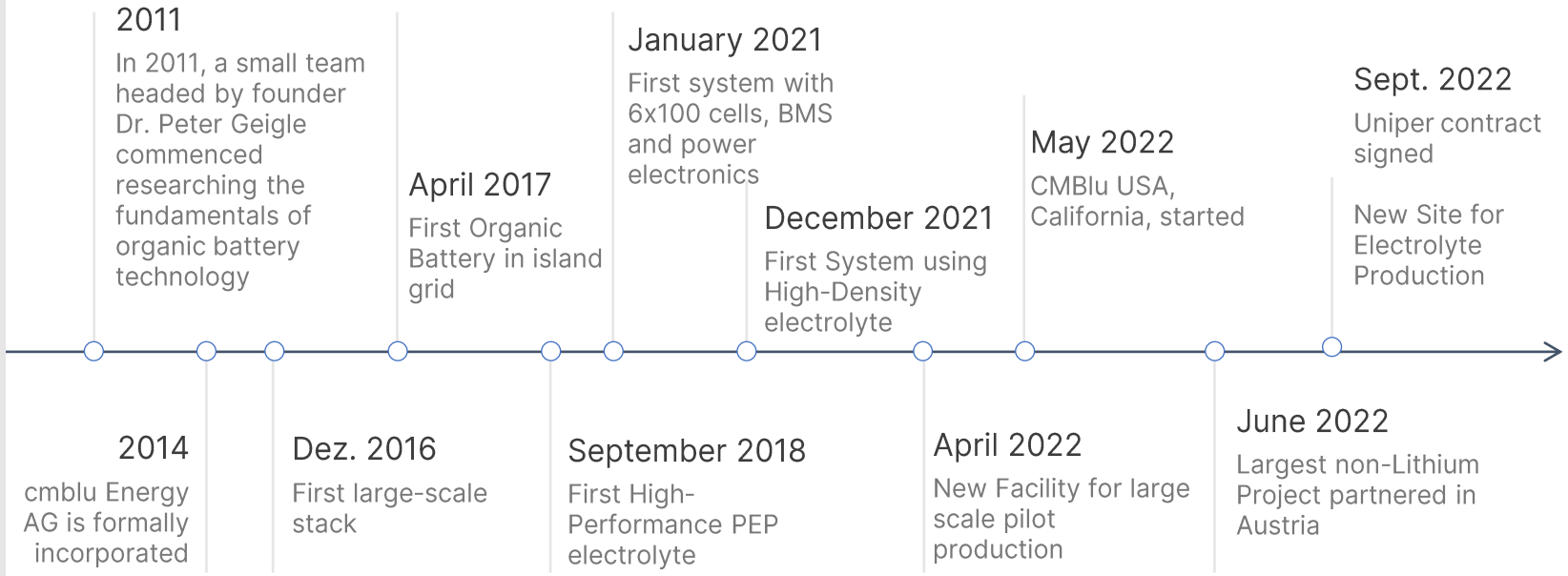
OWNERSHIP STRUCTURE

The company is privately owned by five very experienced shareholders

The company has the structure to go public

- Fully audited, IFRS, simple structure, no legal cases, qualifies as FPI

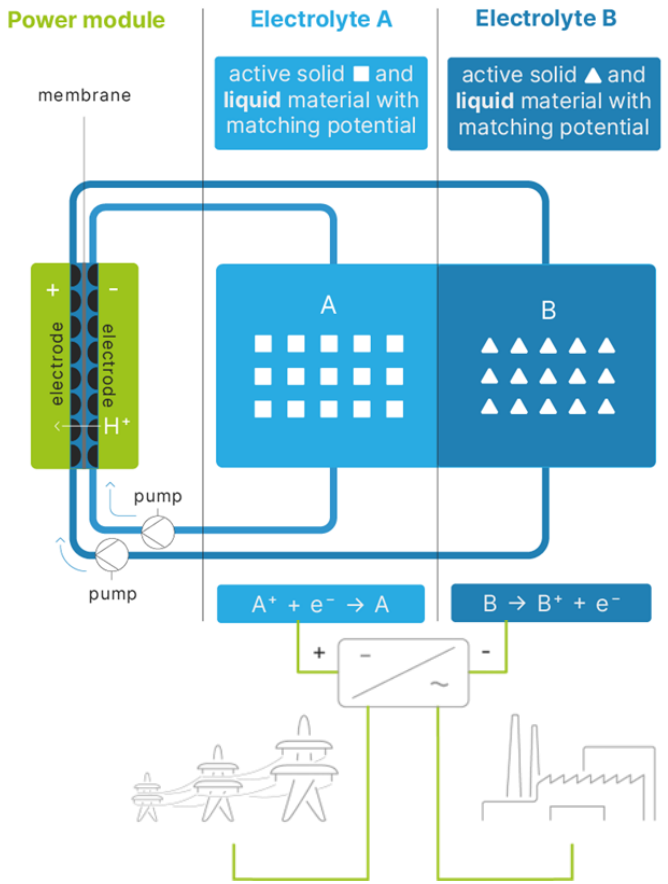
- Incorporated in 2014
- HQ: Alzenau, Frankfurt area, Germany
- CMBlu, Inc.: Petaluma, California
- Employees: 190+
- USD 100+m equity
- No debt



To be continued……

The SolidFlow Organic Battery

Simple Design Utilizes Proven Flow and Solid-State Battery Technology



Innovative design through storing energy in the solid, resulting in higher stability of electrolytes and increased energy density

Step Change in Improvement Compared to the State of the Art

Made from Organic, Non-Conflict Materials

Non-Flammable and Non-Explosive Materials

Highly Efficient

Technologically De-Risked

3rd Party Tested and Validated

Tested & Verified

Certified

CMBlu technology is based on water, salts and polymers

High Density Storage Using Organic Polymers

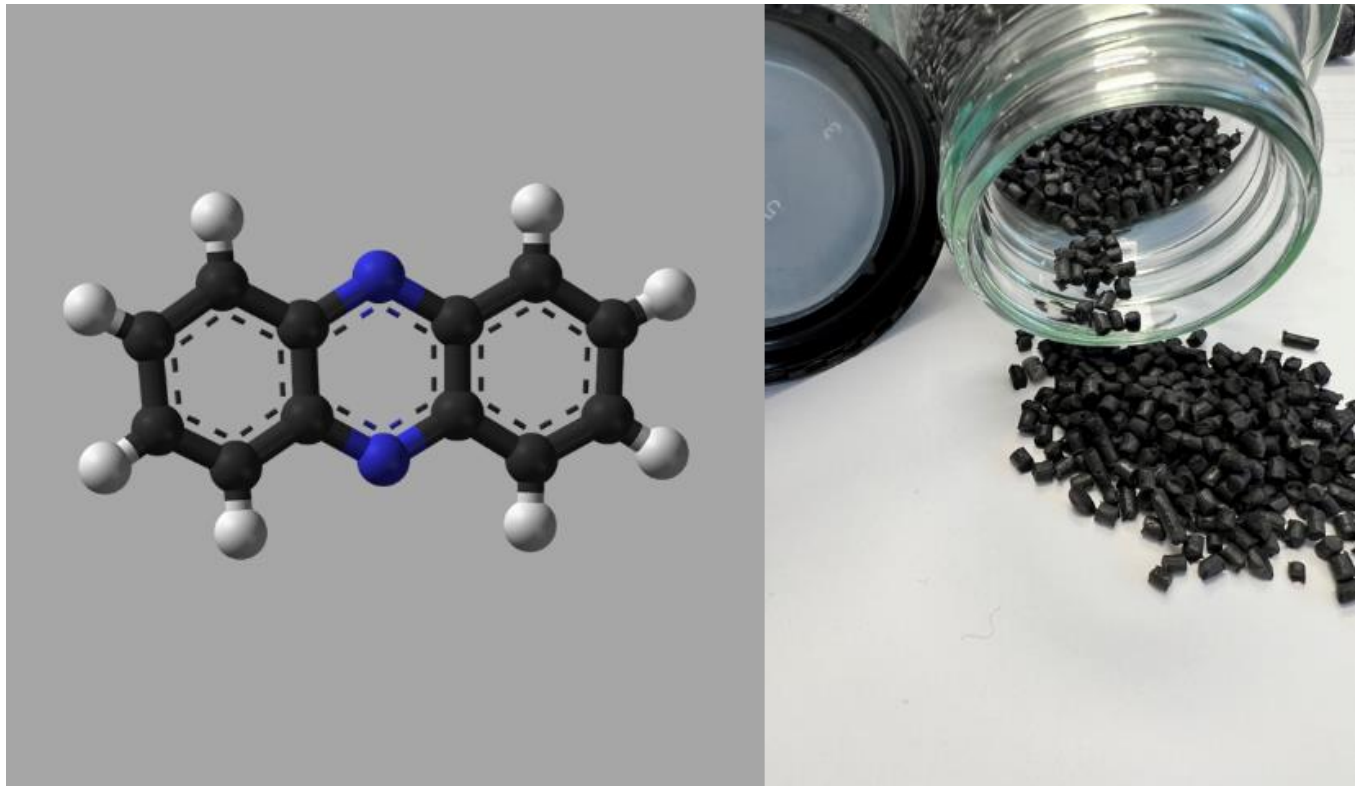
CMBlu Technology combines “Solid State” and “Flow Battery” Technology

High-performance Flow System

- Aqueous system
- Safe, non-flammable
- Low concentration, moderate pH

High-capacity Solid Storage System

- We use carbon-based polymers
- Very high capacity > 200 Wh/kg
- up to 98% of the energy is stored in the solid
- No contact between the electrodes and membranes
- Powerful, stable, low-cost




+100
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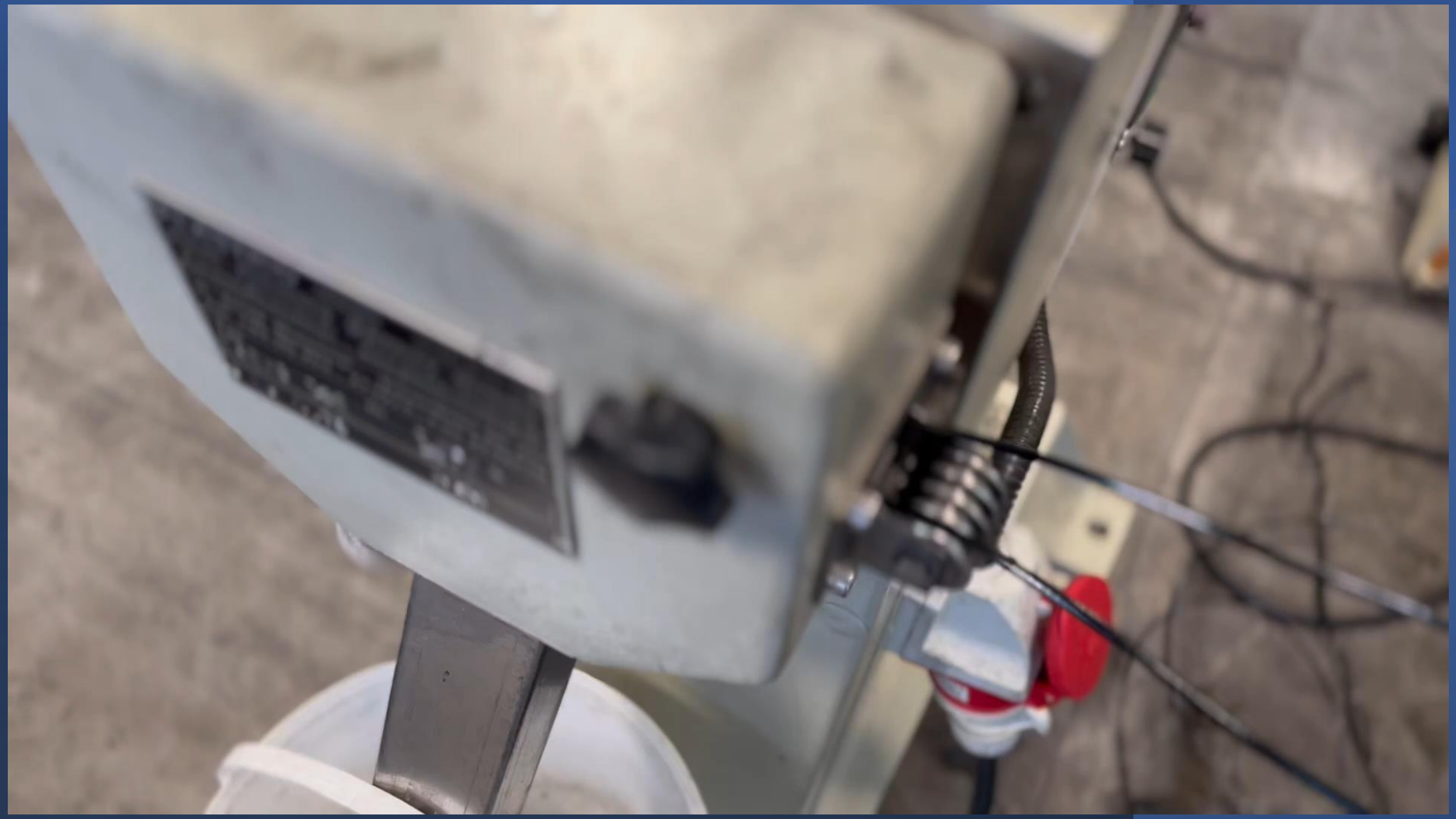
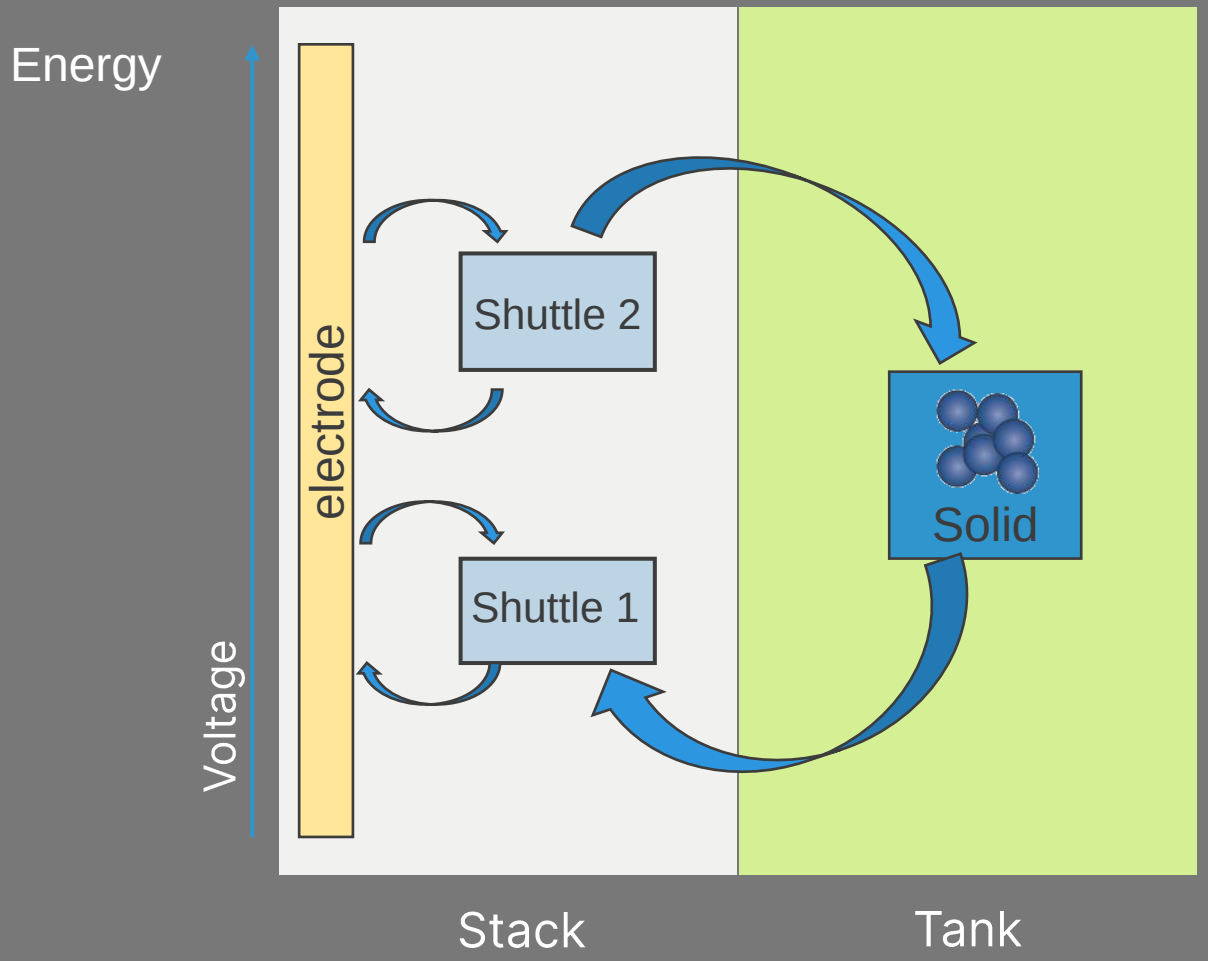
COPERION
WERNER & PFLEIDERER



Effective 2-Shuttle 1-Solid System



- Classic electron transfer between electrode and both shuttles, driven and controlled by external voltage
- Electron transfer **from shuttle 2 to solid and from solid to shuttle 1** is a spontaneous chemical reaction **without an external voltage**. Energy "flows down"

Efficiency up to 90%

Roundtrip efficiency DC/DC = CE · VE (CE: Coulomb Efficiency, VE: Voltage Efficiency)

CE ca. 100%

- no cross over of active material
- shuttle molecules hardly influence CE (2% of energy, high concentration)
- no degradation of polymer

VE depends on voltage and stack resistance

10 mV potential gap between Shuttle and Solid → 3% loss

Stack at <2 Ohm cm^2 → 4% loss at 1/5 rated current, 9% loss at 170 A (rated current)

Control and Sensors <1% loss

Pumps <2% loss

Innovative Carbon-Based (Organic) Solid-flow Battery Design

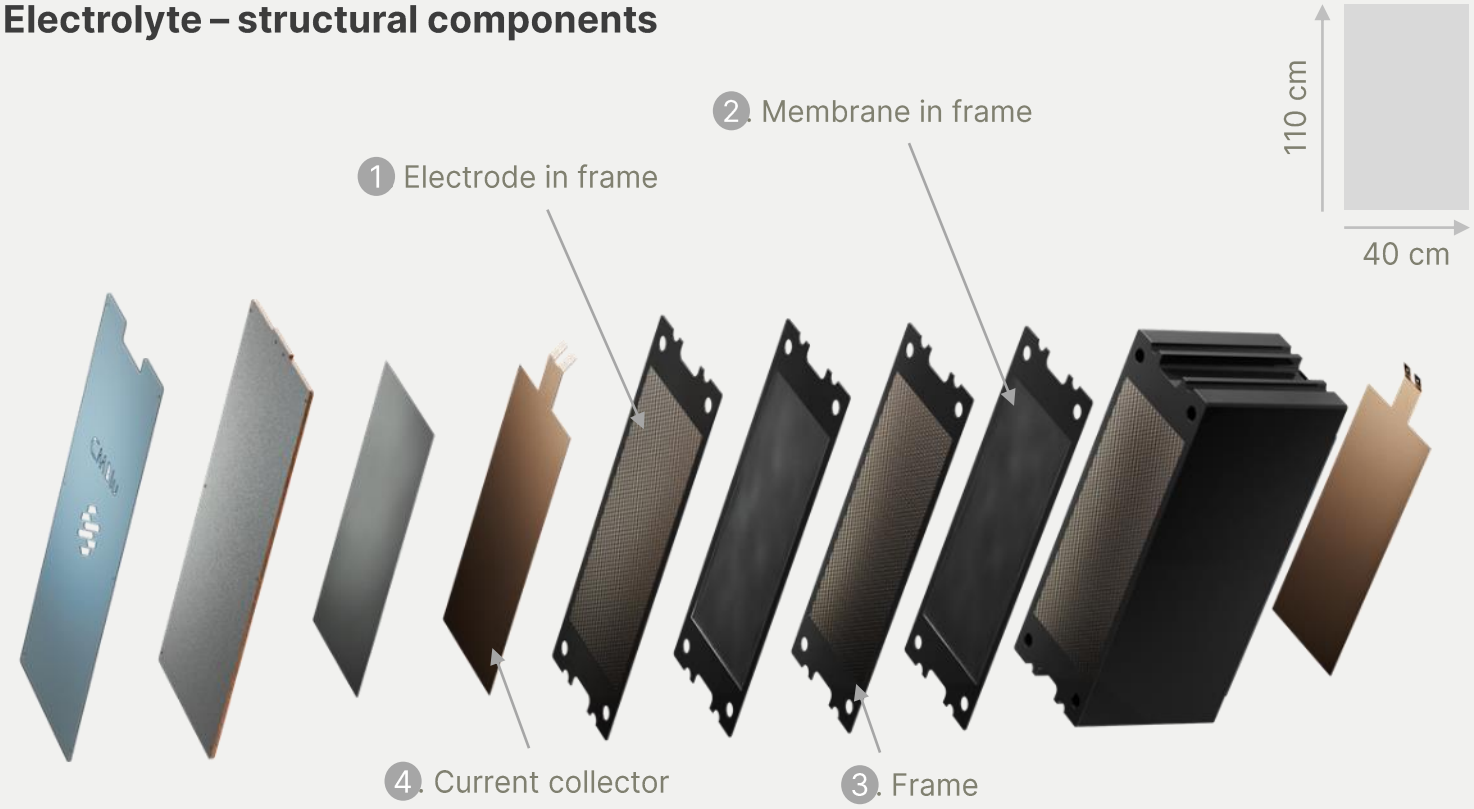
Designed to be modular and easy to source locally at best cost

A battery segment consists of serially connected half cells with the following components:

1. Electrodes (carbon-based)
2. Membranes (carbon-based)
3. Frames (polypropylene)
4. Current collector

- ✓ Simple & stable
- ✓ Cost-efficient material
- ✓ Recyclable
- ✓ Regional sourcing
- ✓ No rare or conflicted materials
- ✓ Longer service life due to welding

Electrolyte – structural components



cmblu

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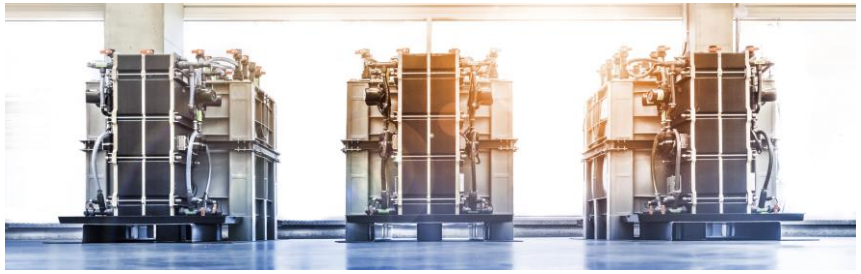
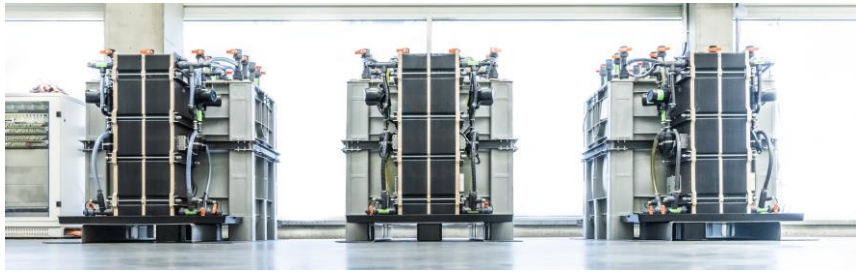
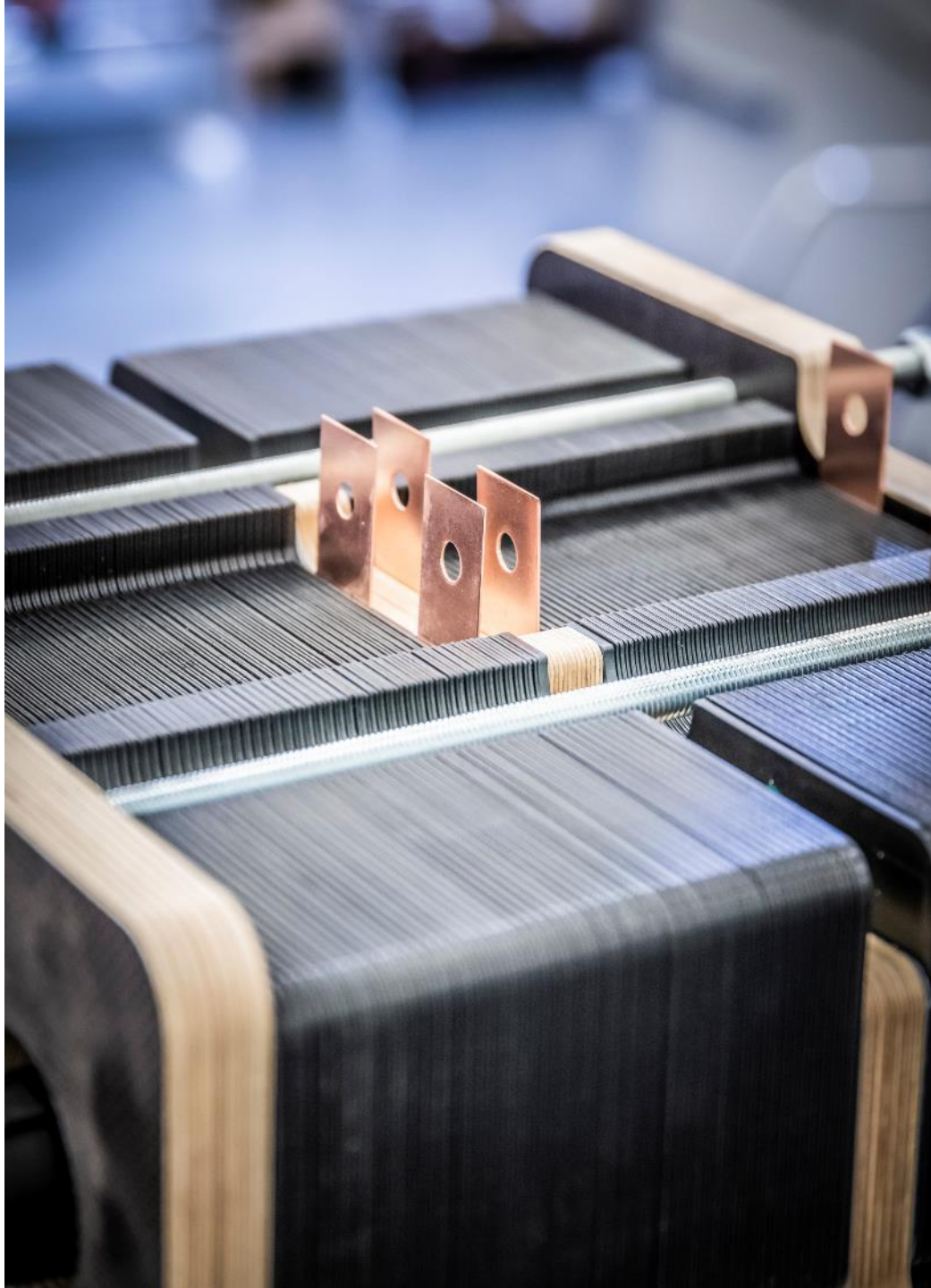




1. **Low Cost**
2. **High Efficiency**
3. **Long Duration**
4. **Safe & Sustainable**
5. **Scalable** *(Manufacturing & Technology)*



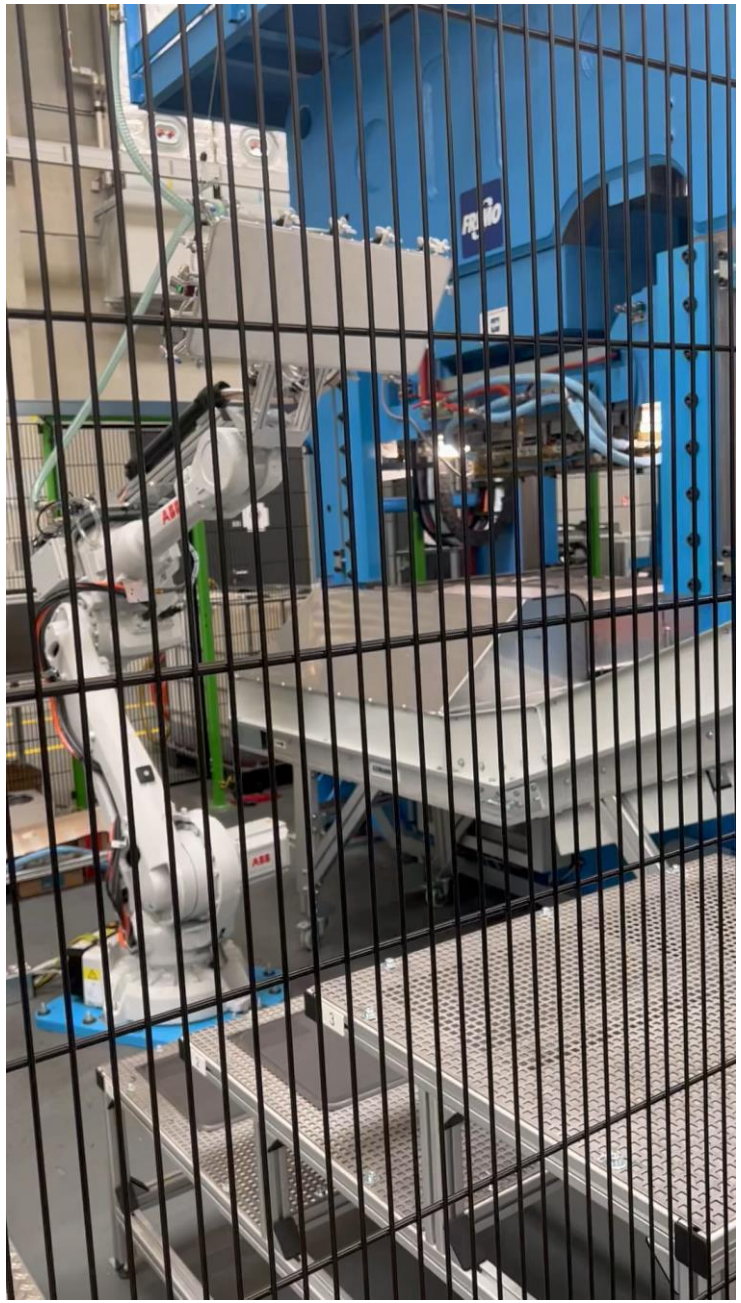
cmblu

Built for Purpose

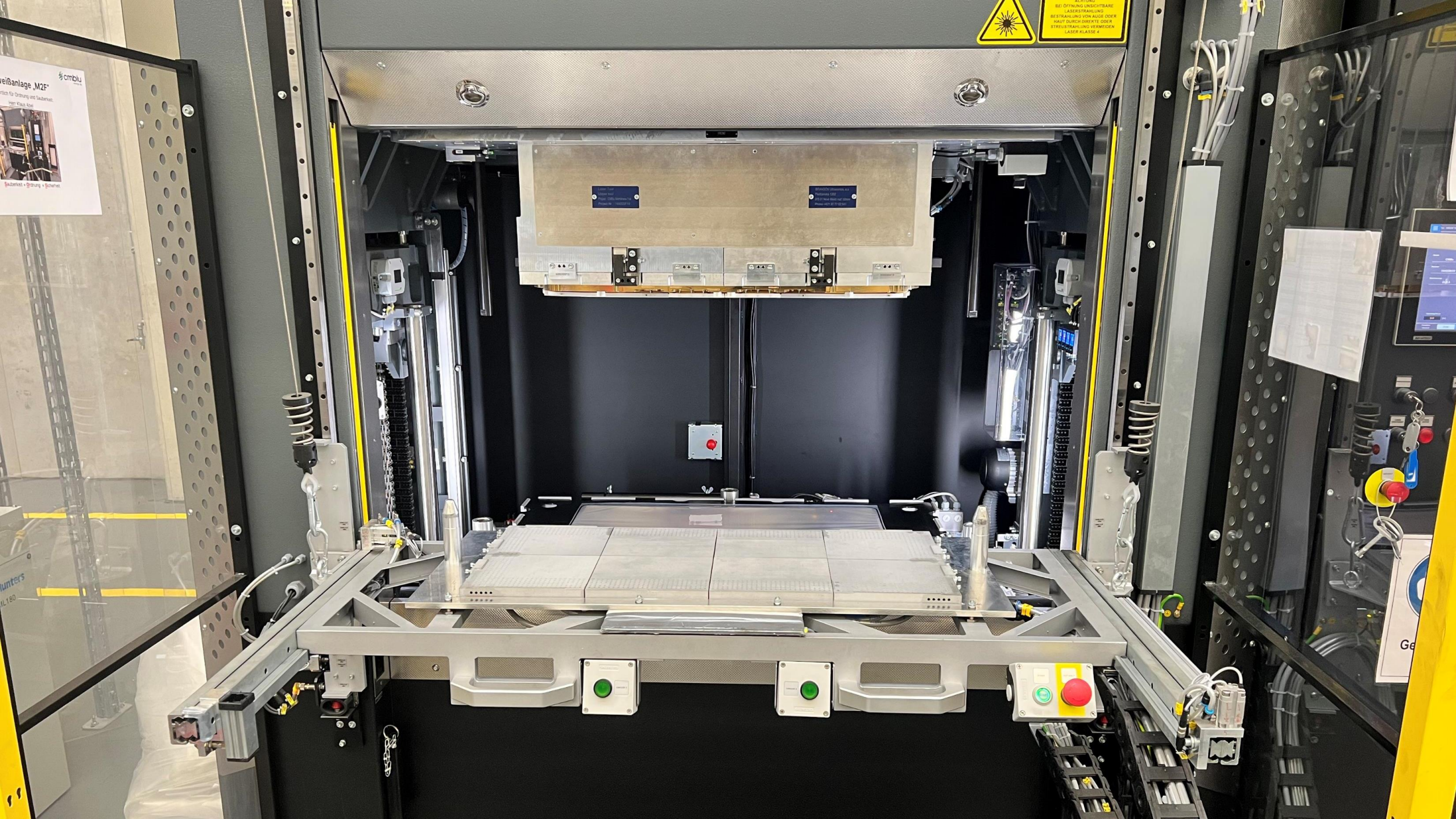
System Overview

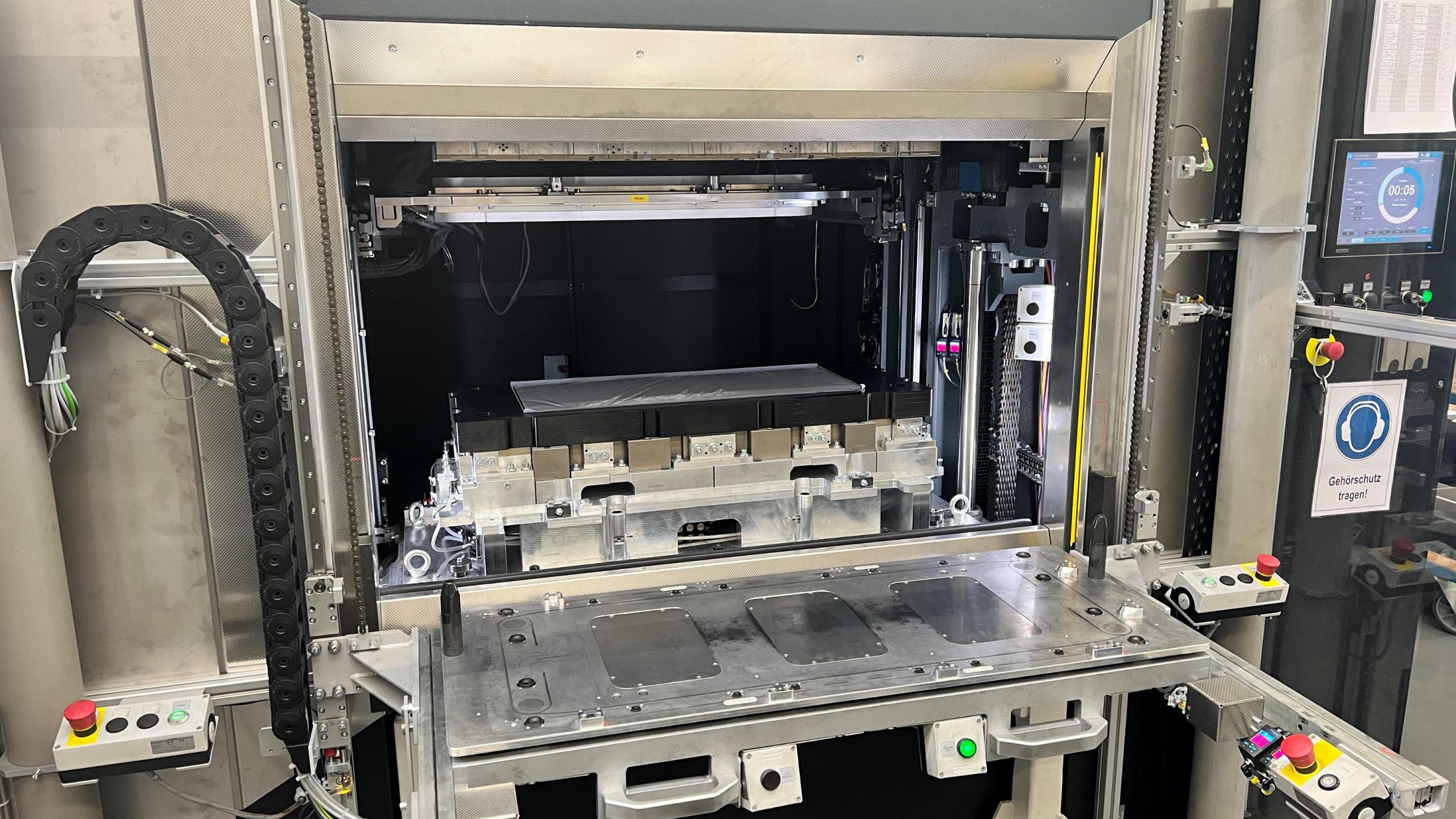
Cycle Life	> 20,000(1)
Scalability	Modular & Scalable
Energy Density	200 Wh/kg
Storage Time	Minutes to days
Efficiency	Up to ~90%
Max capacity	Up to GWh range
Footprint	2.5 sqm/MWh
Safety	CE-marked Non-flammable
TRL	7-8

Source: Company estimate, CMBlu company model and TUV Sud.
(1) CMBlu project life reflects 20 years and 3 cycles per day or 21,000 cycles




XRC


cmblu
Sauberkeit + Ordnung + Sicherheit


00:05
Gehörschutz tragen!

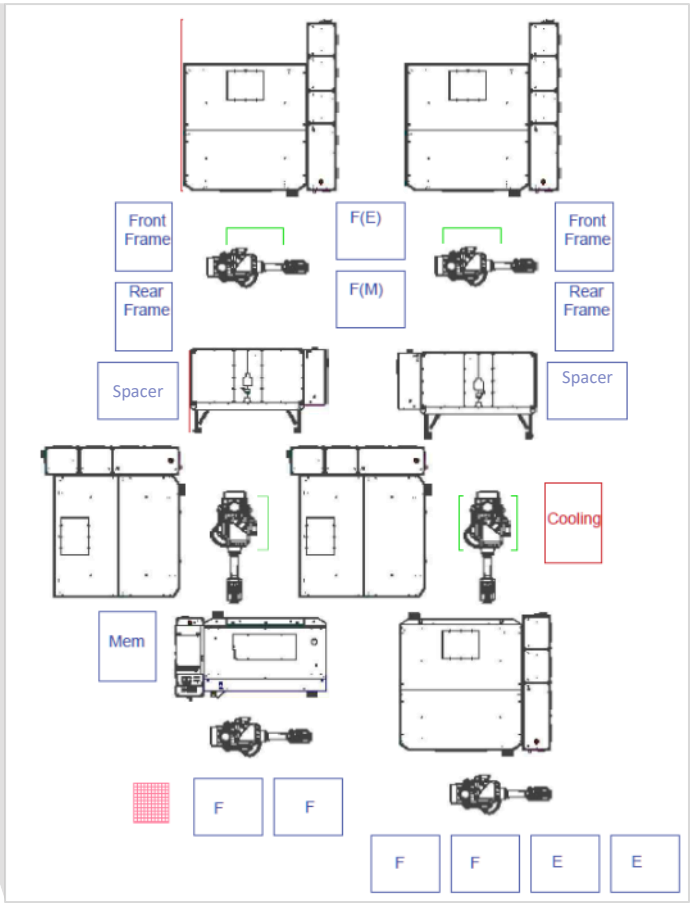
Highly Scalable Manufacturing

CMBlu designed a highly efficient, scalable and automated automotive-like production process

Production Cell #1 | Production Cell #2 | Production Cell #3

- ✓ Easily replicated layout and machinery allows for easy reproduction across geographic locations
- ✓ Each production cell is capable of making the hardware for 900MWh(1)
- ✓ Number of production cells can be expanded as desired

Standard Production Cell Layout



Automated

*Highly **automated, cost-efficient** production in **low labor-intensive** production cells*

Scalable

*"Copy Exact" production blueprint, enabling **the same** manufacturing dynamics and modular scalability*

Safe

*Significantly **lower safety and environmental requirements** compared to lithium battery production*

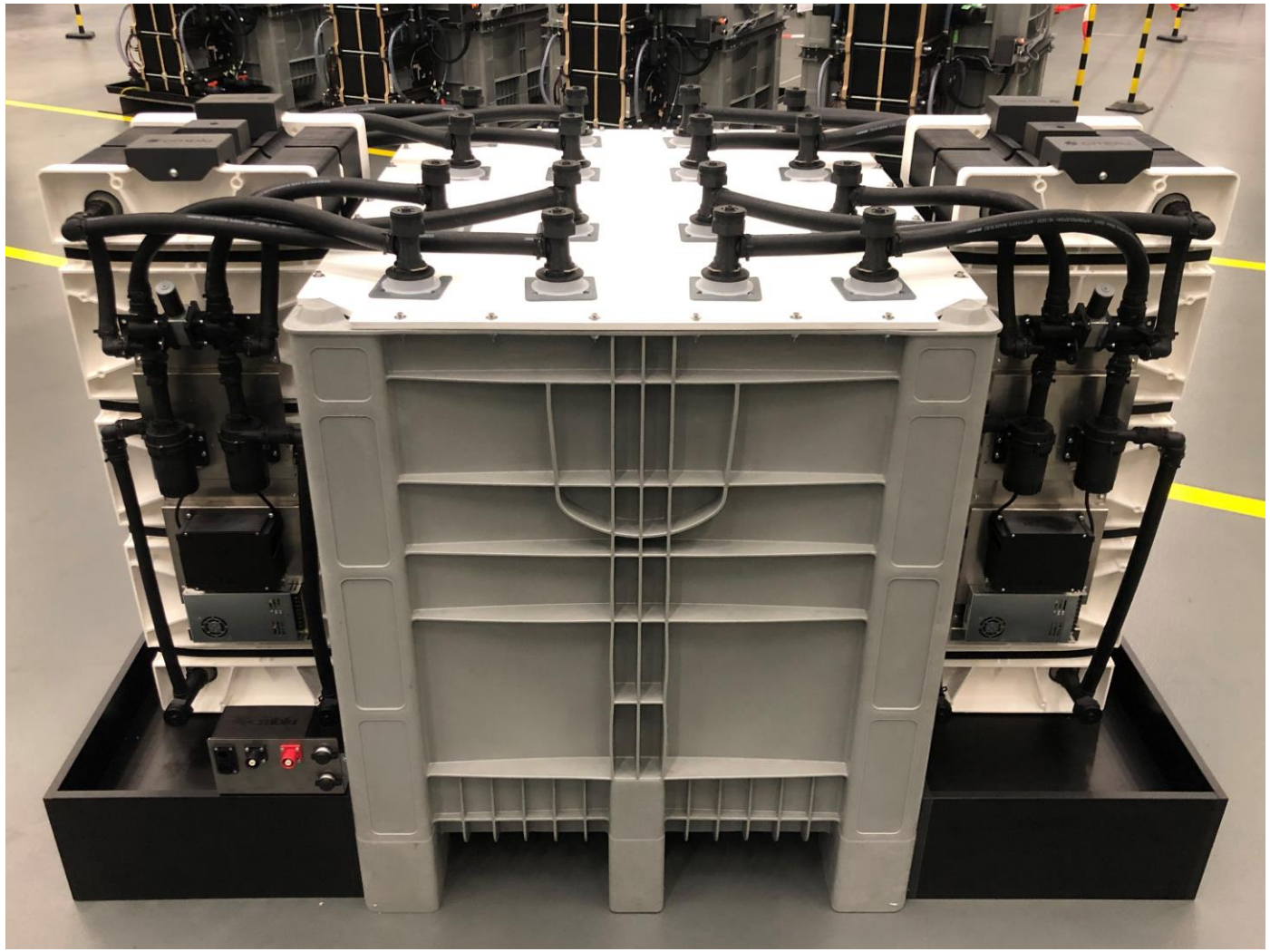
Independent

Supply chain security** due to local sourcing of materials, **independence from rare or conflicted materials

Source: TUV Technical Due Diligence Report.
Note: "Production cell" represents a single automated manufacturing unit, capable of producing 15,000 segments annually.
(1) Reflects full production cell capacity in 2023


F2F Assy SN 100 005 88
Segment SN 100 00
SEG 20220909 #533
54 Zeller
Mit TFP Carbon Vlies 17g/m²
F2F Assy SN 100 005 89
Segment SN 100 00
SEG 20220912 #534
54 Zeller
Mit TFP Carbon Vlies 17g/m²
F2F Assy SN 100 005 90
Segment SN 100 00
SEG 20220912 #535
54 Zeller
Mit TFP Carbon Vlies 17g/m²
F2F Assy SN 100 005 87
Segment SN 100 00
SEG 20220909 #532
54 Zeller
F2F Assy SN 100 005 86
Segment SN 100 00
54 Zeller
F2F Assy SN 100 005 91
Segment SN 100 00
54 Zeller
F2F Assy SN 100 005 92
Segment SN 100 00
54 Zeller

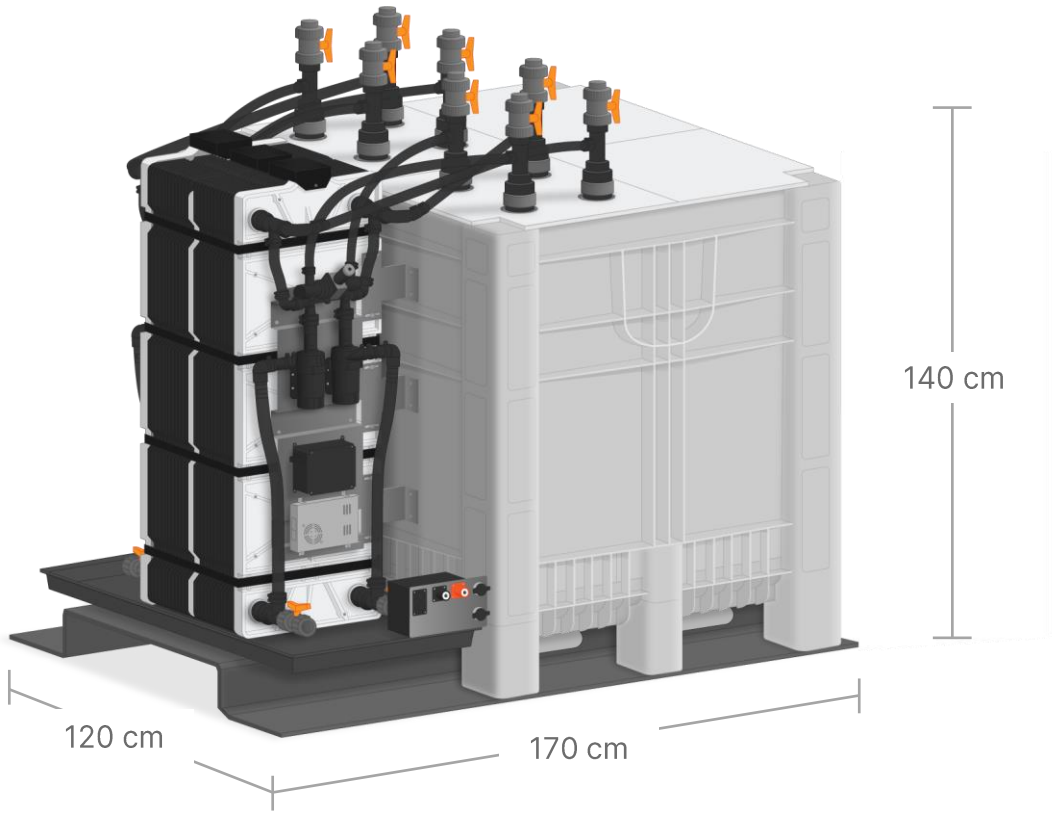
CMBlu Modularity



5 – hour system

- 40 kW, 200 kWh
- 1,900kg
- Plug & Play
- CE-marked
- Footprint 2,5m² (210*120*140cm)
- Stackable =>2.5m²/MWh
  (Tesla 3.9m²/MWh*)

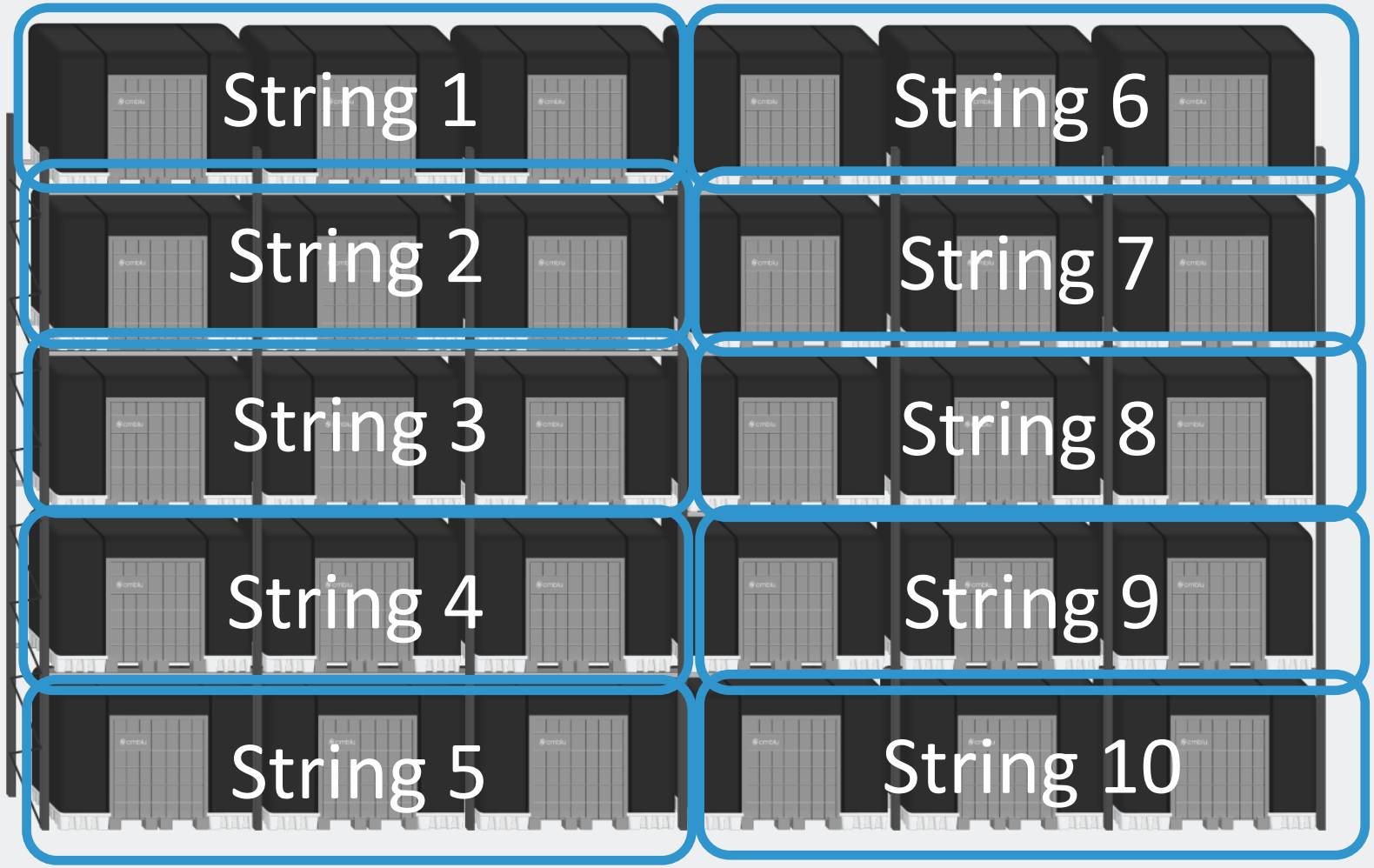
CMBlu Modularity



10 – hour system

- 20 kW, 200 kWh
- Plug & Play
- CE-marked
- Footprint 2 m²
- Stackable =>2 m²/MWh (Tesla 3.9m²/MWh*)

cmblu modularity



1,2 MW, 6 MWh System

Multi-String Configuration

- Each string has 120 kW / 600 kWh, 600-960 Volt DC
- One AC/DC per string
- Output 400 V AC, 3 phas.
- (480 V AC in the US)
- Each string runs independently => High redundancy

cmblu modularity

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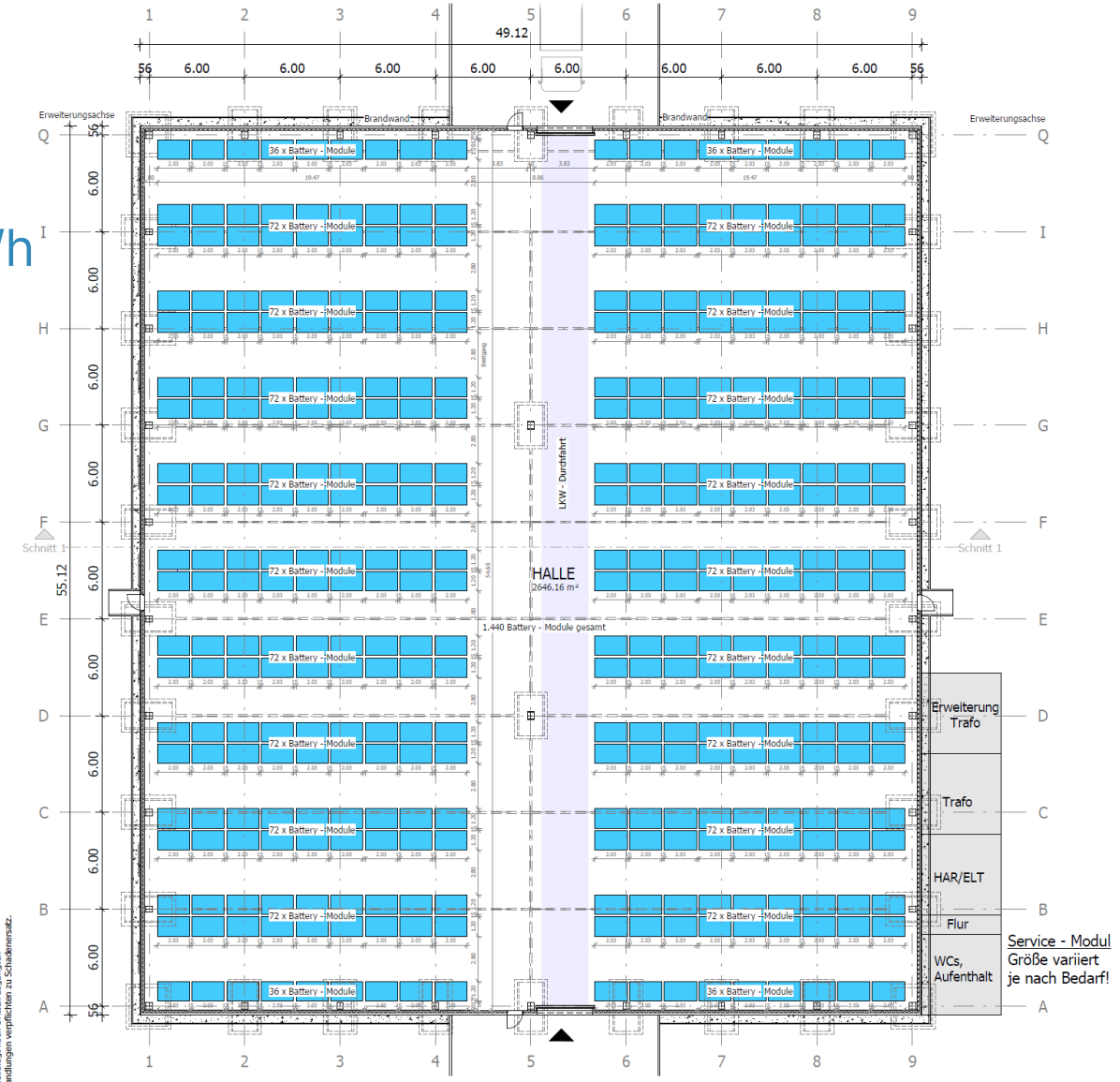
Modularity

- 50 MW – 250 MWh
- Compact
- Safe
- Sustainable
- Ultra-redundant



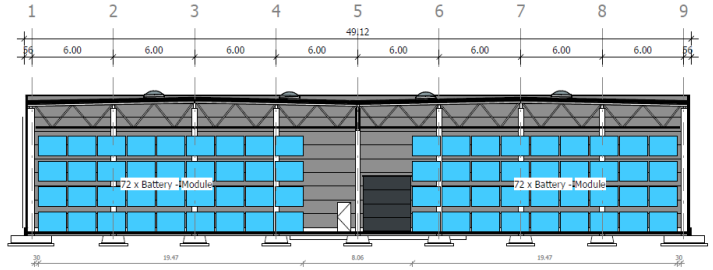
Grundriss 1

M 1 : 200

Halle BGF ca. 2.708m², Trafos ausgelagert in Service - Modul
gem. IndBauRL
Brandabschnitt bis 2.700m², OK Lagergut weniger als 7.50m,
keine selbsttätige Feuerlöschanlagen notwendig!

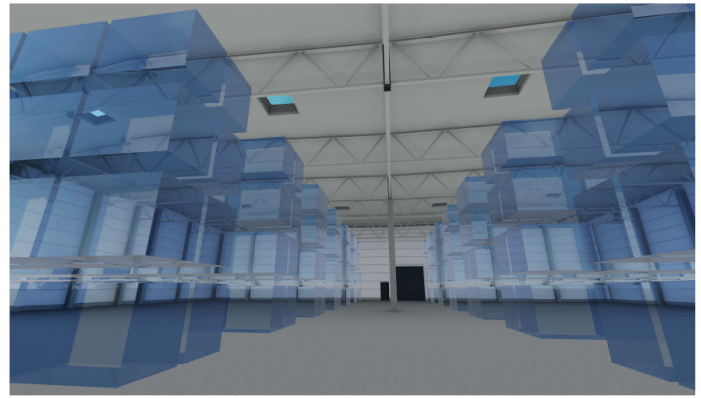
Schnitt Schema 1

M 1 : 200



Schnitt 1

M 1 : 250



Visualisierung

Halle Batterie cmblu

Bauherr:
CMBlu Energy AG
Industriestraße 19
63755 Alzenau

Konzeptstudie

Übersichtsplan

Format: DIN A2, 594 x 420 mm

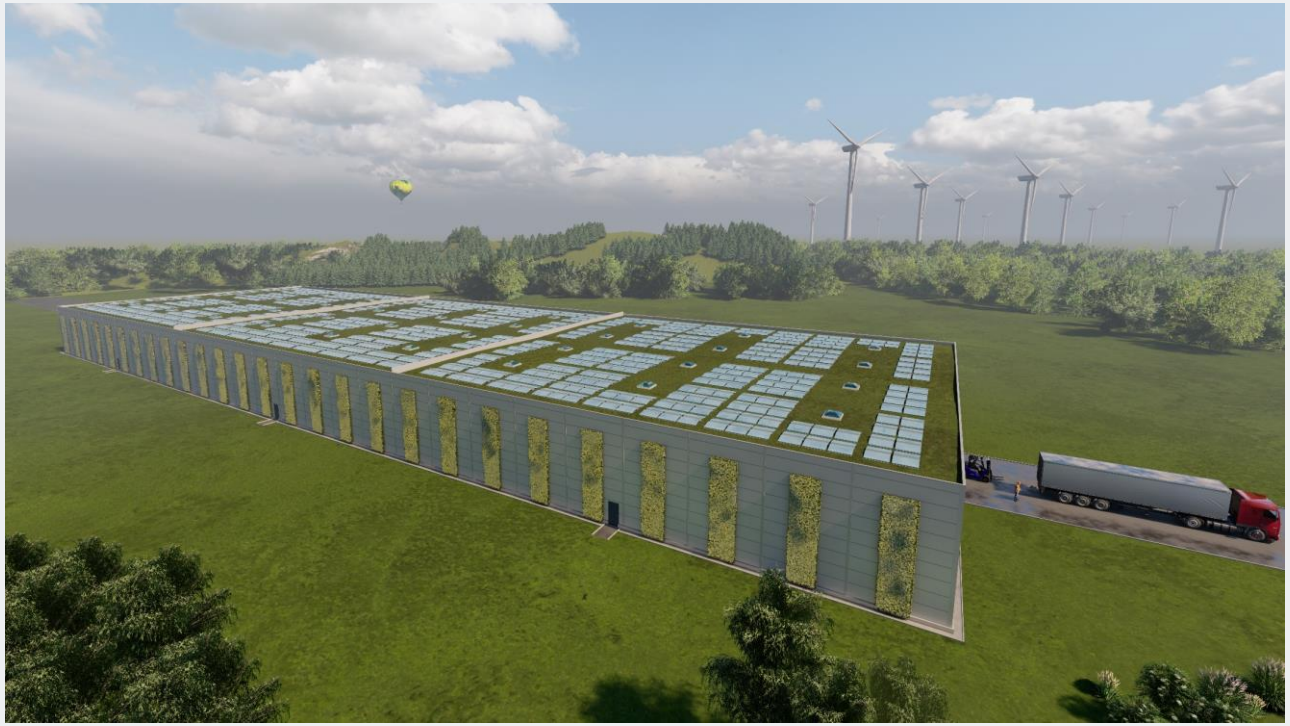
cmblu

cmblu modularity

A warehouse for electricity

- 50 MW – 250 MWh
- Compact
- Safe
- Sustainable
- Ultra-redundant
- Intermediate storage of very large amounts of energy

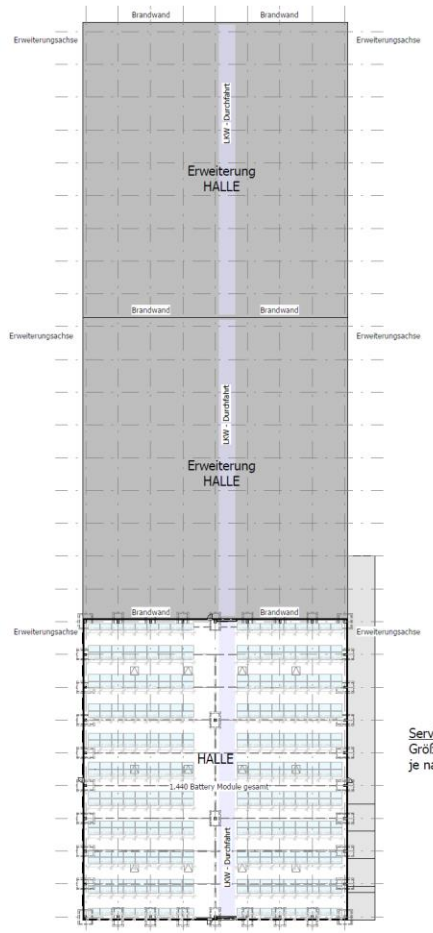
cmblu modularity



A warehouse for electricity

- 150 MW – 750 MWh

cmblu modularity



Service - Modul
Größe variiert
je nach Bedarf!

Grundriss 1 Hallenerweiterung
M 1 : 500

Visualisierung

Visualisierung

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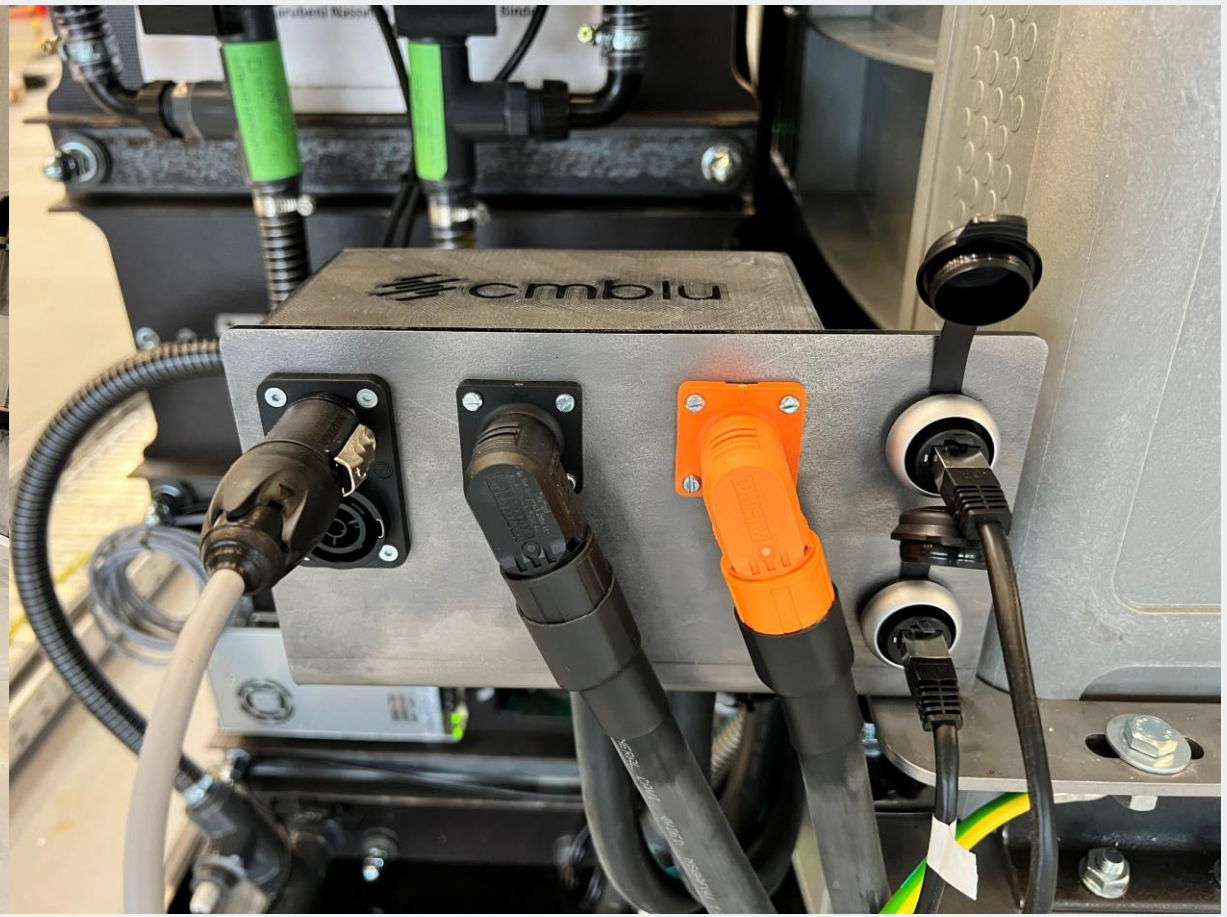
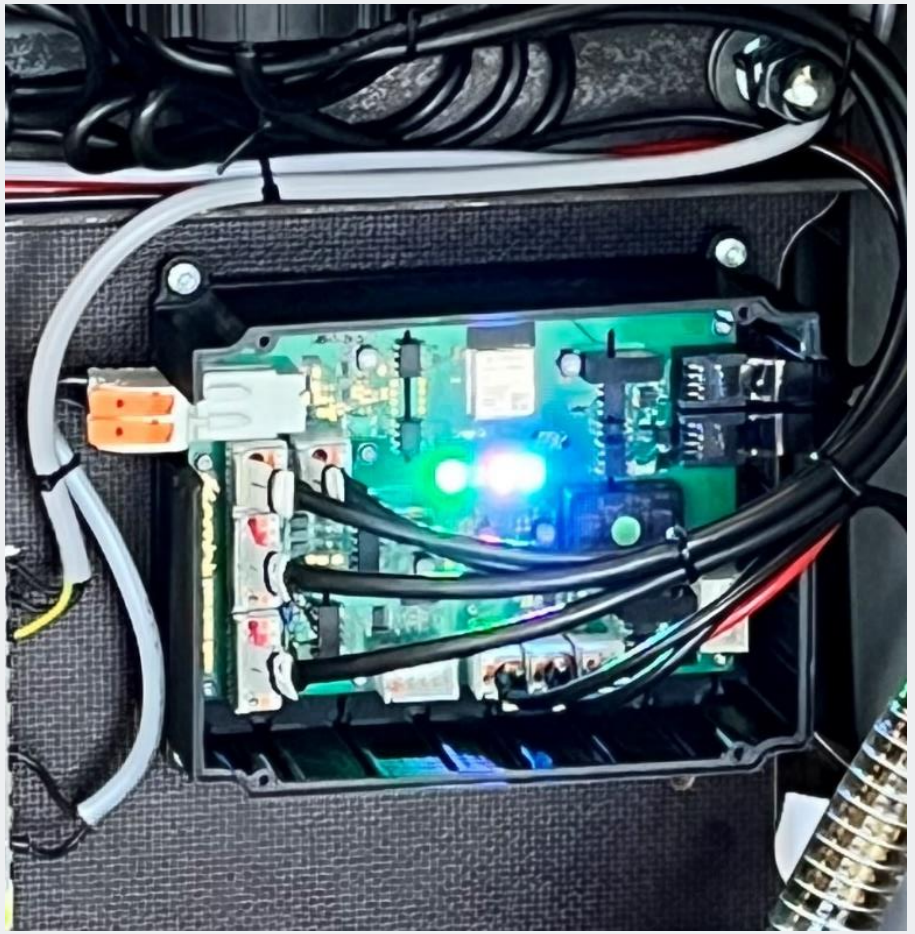
cmblu modularity



cmblu modularity

String controller



Embedded system with BMS and IoT

Thank you